

REMARKS

The Office Action mailed June 16, 2004 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-45 are now pending in this application. Claims 1-18, 23-40 and 45 stand rejected. Claims 19-22 and 41-44 stand objected to.

The rejection of Claims 4-5, 14, 26-27, 36 and 45 under 35 U.S.C. § 101 as being inoperative is respectfully traversed. Specifically, the specification has been amended to provide corrected units for the constants. As such, the Claims, particularly the formulas contained within the Claims, produce the correct resultant units. Accordingly, Applicant respectfully requests that the 101 rejection be withdrawn.

The rejection of Claims 6, 28 and 45 under 35 U.S.C. § 112, first paragraph, is respectfully traversed. Applicant respectfully traverses the suggestion in the Office Action, at page 3, that the claims contain subject matter which was not described in the specification. More specifically, Applicant traverses the suggestion that “the elevation functions used to calculate $F_{(ef)}$ are not described in the specification.” Particularly, by way of example only, the specification, at page 7, recites “Elevation caused forces are expressed by $M (K_{e1} E_1(t) + K_{e2} E_2(t) + K_{e3} E_3(t) + K_{e4} E_4(t)) \dots$ ” and, at page 8, the specification recites “an elevation effect on consist section j of segment i is $f_{ij} = M_i g l_{ij} / L_i \cos(\pi/2 - \alpha_{ij}) \dots$ ” As such, Applicant submits that the elevation functions are described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor had possession of the claimed invention. Accordingly, Applicant respectfully requests that the Section 112 rejections of Claims 6, 28, and 45 be withdrawn.

The rejection of Claims 4-14, 26-36 and 45 under 35 U.S.C. § 112, second paragraph, is respectfully traversed. Specifically, Claims 4-14, 26-36 and 45 have each been amended as suggested by the Examiner. As such, the parameters in the claimed equations are defined in the bodies of the claims. Accordingly, Applicant respectfully requests that the 112, second paragraph, rejection be withdrawn.

The rejection of Claims 1-3, 15-16, 23-25 and 37-38 under 35 U.S.C. § 102(b) as being anticipated by Gruber, P. et al., "Suboptimal Control Strategies for Multilocomotive Powered Trains", IEEE Transactions on Automatic Control, June 1982, Volume 27, Issue 3, pages 536-546 ("Gruber") is respectfully traversed.

Gruber describes a controller for operating multi-locomotive powered trains using suboptimal control strategies for minimizing coupler forces between the railcars. The control strategies are derived from two different small scale train models. One train model represents a reduced order model of the long train, the other train model uses a short train configuration consisting of fewer cars than the long train. From the two train models, a control law is predicted for the long train. Additionally, since not all of the parameters are measurable, the train models use estimates to determine the control law. As such, the results of the small scale train models obtained are adapted to the large scale system to determine the operations of the long train.

Claim 1 recites a method for predicting train consist reactions to specific stimuli using a system including at least one measurement sensor located on a train consist, a data base, and a computer, the train consist including at least one locomotive and at least one railcar, wherein the method includes "collecting sensor data as the consist is moving...determining a consist force balance utilizing the sensor data and the computer...determining a set of consist coefficients using the computer...predicting train consist kinetic characteristic values using the consist force balance and the set of consist coefficients."

Gruber does not describe or suggest a method for predicting train consist reactions to specific stimuli as recited in Claim 1. More specifically, Gruber does not describe or suggest a method including collecting sensor data as the consist is moving, determining a consist force balance utilizing the sensor data, and predicting train consist kinetic characteristic values using the consist force balance and a set of consist coefficients. Rather, in contrast to the present invention, Gruber describes a controller for operating multi-locomotive powered trains using sub-optimal control strategies derived from two different small scale train models

and adapted to determine the operations of the long train. Notably, Gruber does not describe collecting sensor data and determining a train force balance using sensor data. As such, Gruber does not describe predicting train consist kinetic characteristic values using the consist force balance.

Moreover, Applicant respectfully traverses the suggestion in the Office Action at page 5, paragraph 17, that Gruber describes collecting sensor data. Specifically, the Office Action suggests that the “exchange of information along the train...” describes collecting sensor data. Applicant respectfully disagrees. In fact, Applicant submits that Gruber does not describe or suggest collecting sensor data. For example, Gruber, at page 542, recites “there is a need of approximating or estimating [the individual rail car] velocities...”, and as such, the sensor data relating to the individual rail car velocities is not collected. Additionally, Applicant respectfully submits that “an exchange of information along a train” does not describe collecting sensor data.

Furthermore, Applicant respectfully traverses the suggestion in the Office Action at page 5, paragraph 17, that Gruber describes determining a consist force balance. Specifically, the Office Action suggests that the deviation formulas correlate to a balance of forces. Applicant respectfully disagrees. In fact, Applicant submits that Gruber does not describe or suggest determining a consist force balance. Rather, Gruber describes an equation for determining the momentum of the train based on the mass of the train and the velocity vector of the train, and does not determine a balance of forces as recited in Claim 1. Accordingly, for the reasons set forth above, Claim 1 is submitted to be patentable over Gruber.

Claims 2-3 and 15-16 depend from independent Claim 1. When the recitations of Claims 2-3 and 15-16 are considered in combination with the recitations of Claim 1, Applicant submits that dependent Claims 2-3 and 15-16 likewise are patentable over Gruber.

Claim 23 recites a system for predicting reactions of a train consist to specific stimuli, wherein the system includes at least one measurement sensor located on the train consist, a data base, and a computer, the train consist includes at least one locomotive and at

least one railcar, wherein the system is configured to “collect sensor data as the consist is moving...determine a consist force balance utilizing the sensor data and said computer...determine a set of consist coefficients using said computer...predict train consist kinetic characteristic values using the consist force balance and the set of consist coefficients.”

Gruber does not describe or suggest a system for predicting reactions of a train consist to specific stimuli as recited in Claim 23. More specifically, Gruber does not describe or suggest a system configured to collect sensor data as the consist is moving, determine a consist force balance utilizing the sensor data, and predict train consist kinetic characteristic values using the consist force balance and the set of consist coefficients. Rather, in contrast to the present invention, Gruber describes a controller for operating multi-locomotive powered trains using sub-optimal control strategies derived from two different small scale train models and adapted to determine the operations of the long train. Notably, Gruber does not describe collecting sensor data and determining a train force balance using sensor data. As such, Gruber does not describe predicting train consist kinetic characteristic values using the consist force balance. Accordingly, for the reasons set forth above, Claim 23 is submitted to be patentable over Gruber.

Claims 24-25 and 37-38 depend from independent Claim 23. When the recitations of Claims 24-25 and 37-38 are considered in combination with the recitations of Claim 23, Applicant submits that dependent Claims 24-25 and 37-38 likewise are patentable over Gruber.

For the reasons set forth above, Applicant respectfully requests that the Section 102 rejection of Claims 1-3, 15-16, 23-25 and 37-38 be withdrawn.

The rejection of Claims 17-18 and 39-40 under 35 U.S.C. § 103 as being unpatentable over Gruber in view of Claerbout, “Confidence Intervals” and “Data Modeling by Least Squares”, Fundamentals of Geophysical Processing (FGDP), (“Claerbout FGDP”) and further in view of Claerbout, “Spectral Factorization”, Earth Soundings Analysis: Processing versus Inversion (PVI) (“Claerbout PVI”) is respectfully traversed.

Gruber is described above. Claerbout FGDP describes the use of the least squares method to develop a wave shaping filter, such as a prediction-error filter. Moreover, Claerbout PVI describes the use of spectral factorization of an inverse spectrum to obtain a prediction-error filter.

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Gruber, Claerbout FGDP, or Claerbout PVI, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Gruber with any of Claerbout FGDP or Claerbout PVI, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching. Rather, only the conclusory statement that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Gruber with those of Claerbout FGDP, because Claerbout PVI teaches that the use of the least squares method was a well-known step backwards in the art" suggests combining the disclosures.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levensgood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicant's disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose

among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Since there is no teaching or suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicant requests that the Section 103 rejection be withdrawn.

Further, and to the extent understood, none of Gruber, Claerbout FGDP, or Claerbout PVI, considered alone or in combination, describe or suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 recites a method for predicting train consist reactions to specific stimuli using a system including at least one measurement sensor located on a train consist, a data base, and a computer, the train consist including at least one locomotive and at least one railcar, wherein the method includes “collecting sensor data as the consist is moving...determining a consist force balance utilizing the sensor data and the computer...determining a set of consist coefficients using the computer...predicting train consist kinetic characteristic values using the consist force balance and the set of consist coefficients.”

None of Gruber, Claerbout FGDP, or Claerbout PVI, considered alone or in combination, describe nor suggest a method for predicting train consist reactions to specific stimuli as recited in Claim 1. More specifically, none of Gruber, Claerbout FGDP, or Claerbout PVI, considered alone or in combination, describe nor suggest a method including collecting sensor data as the consist is moving, determining a consist force balance utilizing the sensor data, and predicting train consist kinetic characteristic values using the consist force balance and a set of consist coefficients. Rather, in contrast to the present invention, Gruber describes a controller for operating multi-locomotive powered trains using sub-

optimal control strategies derived from two different small scale train models and adapted to determine the operations of the long train, Claerbout FGDP describes the use of the least squares method to develop a wave shaping filter, such as a prediction-error filter, and Claerbout PVI describes the use of spectral factorization of an inverse spectrum to obtain a prediction-error filter. Accordingly, for the reasons set forth above, Claim 1 is submitted to be patentable over Gruber in view of Claerbout FGDP and further in view of Claerbout PVI.

Claims 17-18 depend from independent Claim 1. When the recitations of Claims 17-18 are considered in combination with the recitations of Claim 1, Applicant submits that dependent Claims 17-18 likewise are patentable over Gruber in view of Claerbout FGDP and further in view of Claerbout PVI.

Claim 23 recites a system for predicting reactions of a train consist to specific stimuli, wherein the system includes at least one measurement sensor located on the train consist, a data base, and a computer, the train consist includes at least one locomotive and at least one railcar, wherein the system is configured to "collect sensor data as the consist is moving...determine a consist force balance utilizing the sensor data and said computer...determine a set of consist coefficients using said computer...predict train consist kinetic characteristic values using the consist force balance and the set of consist coefficients."

None of Gruber, Claerbout FGDP, or Claerbout PVI, considered alone or in combination, describe nor suggest a system for predicting train consist reactions to specific stimuli as recited in Claim 23. More specifically, none of Gruber, Claerbout FGDP, or Claerbout PVI, considered alone or in combination, describe nor suggest a system configured to collect sensor data as the consist is moving, determine a consist force balance utilizing the sensor data, and predict train consist kinetic characteristic values using the consist force balance and the set of consist coefficients. Rather, in contrast to the present invention, Gruber describes a controller for operating multi-locomotive powered trains using sub-optimal control strategies derived from two different small scale train models and adapted to determine the operations of the long train, Claerbout FGDP describes the use of the least squares method to develop a wave shaping filter, such as a prediction-error filter, and

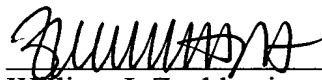
Claerbout PVI describes the use of spectral factorization of an inverse spectrum to obtain a prediction-error filter. Accordingly, for the reasons set forth above, Claim 23 is submitted to be patentable over Gruber in view of Claerbout FGDP and further in view of Claerbout PVI.

Claims 39-40 depend from independent Claim 23. When the recitations of Claims 39-40 are considered in combination with the recitations of Claim 23, Applicant submits that dependent Claims 39-40 likewise are patentable over Gruber in view of Claerbout FGDP and further in view of Claerbout PVI.

For the reasons set forth above, Applicant respectfully requests that the Section 103 rejection of Claims 17-18 and 39-40 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



William J. Zychlewicz
Registration No. 51,366
ARMSTRONG TEASDALE LLP
One Metropolitan Square, Suite 2600
St. Louis, Missouri 63102-2740
(314) 621-5070